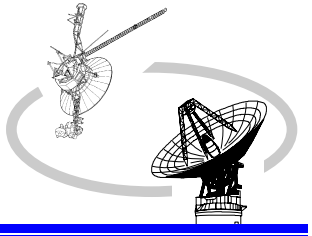


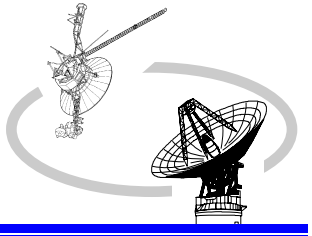
STEREO Ahead & Behind May 26 Launch Study

Joaquin Retana

November 17, 2005

NASA / Jet Propulsion Laboratory

Resource Allocation Planning Service (RAPS)



Purpose

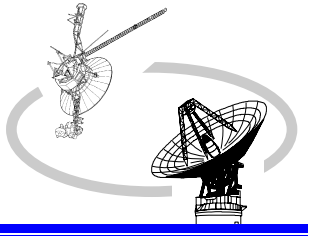
- To evaluate STEREO Ahead (STA) and STEREO Behind (STB) May 26, 2006 launch date. The period covered in this study is May 26 – June 4, 2006

Assumptions

- DSS-16 extended downtime
- DSS-63 downtime for Antenna Controller Replacement
- MRO Aero-braking
- SOHO Keyhole May 27, 2006 through June 15, 2006
- Space Geodesy (SGP) 26-hour support at DSS-65 May 29
- ST5 End of Prime Mission May 29

Assessment Methodology

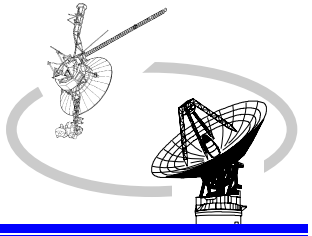
- To evaluate this period, schedules were built to assess the contention level during launch. These schedules have not been negotiated
- The launch schedule from the April 11 launch was used to determine launch, maneuvers and phasing periods for STA and STB



Project Requirement for Launch

Based on the April 11 Launch schedule the following requirements were used for this study.

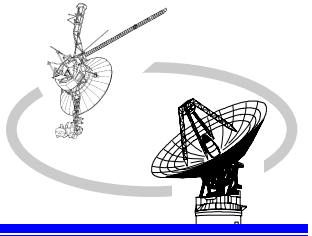
- **STA and STB will use Canberra for Initial Acquisition at the following stations simultaneously; DSS-34, DSS-45 & DSS-46**
- **STA will use DSS-25, DSS-34 and DSS-55 through the first maneuver**
- **STB will use DSS-15, DSS-45 and DSS-65 through the first maneuver**
- **The first maneuver will occur over Canberra on DOY 153 (L+7)**
  - **The back-up maneuver will occur over Goldstone (there is sufficient view period overlap to provide back-up coverage)**
- **Phasing will start after the maneuvers on DOY 154**
- **The attenuators will be used during launch and perigee maneuvers (there are no perigee maneuvers in this period)**



STA and STB Assessment

STA and STB are severely impacted from launch through phasing

- **6 Deep Space Station maintenance blocks are affected 80 to 100 percent:**
  - **DSS-15, DSS-25, DSS-34, DSS-45, DSS-55 and DSS-65**
- **STA and STB will be launching in a period of the year where the view periods for most of the projects start overlapping each other severely**
  (Please refer to view period charts at the end of the presentation)
- **The impact to STA and STB is best illustrated in the schedule bar charts in the following slides**
  - **The first slide is for DOY 146 – 150 and the second slide is for DOY 151 – 155**
- **IMAG, M01O, MGS, MRO, SOHO and VGR1 have 10 or more conflicts with STA and STB in the 10 day period studied**
  - **Out of these conflicts the top three highest contested antennas are:**
    DSS-34 has 38 conflicts
    DSS-65 has 24 conflicts
    DSS-15 has 18 conflicts

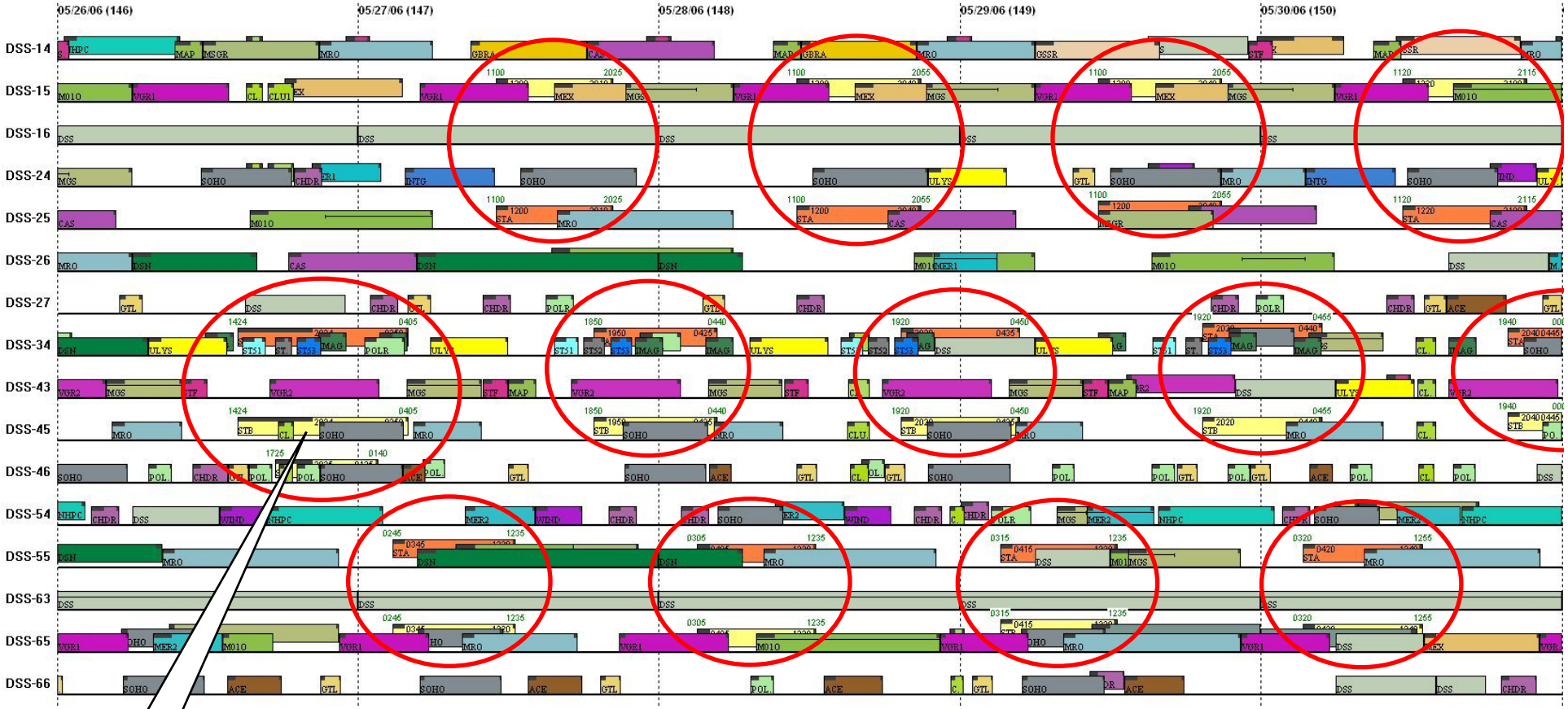


STEREO Ahead & Behind Launch Schedule Bar Charts

Note: STA is represented in Orange, STB is represented in Light yellow.
The red circles indicate where STA & STB passes are scheduled.

Resource Allocation Planning Service (RAPS)

DOY 146 – 150

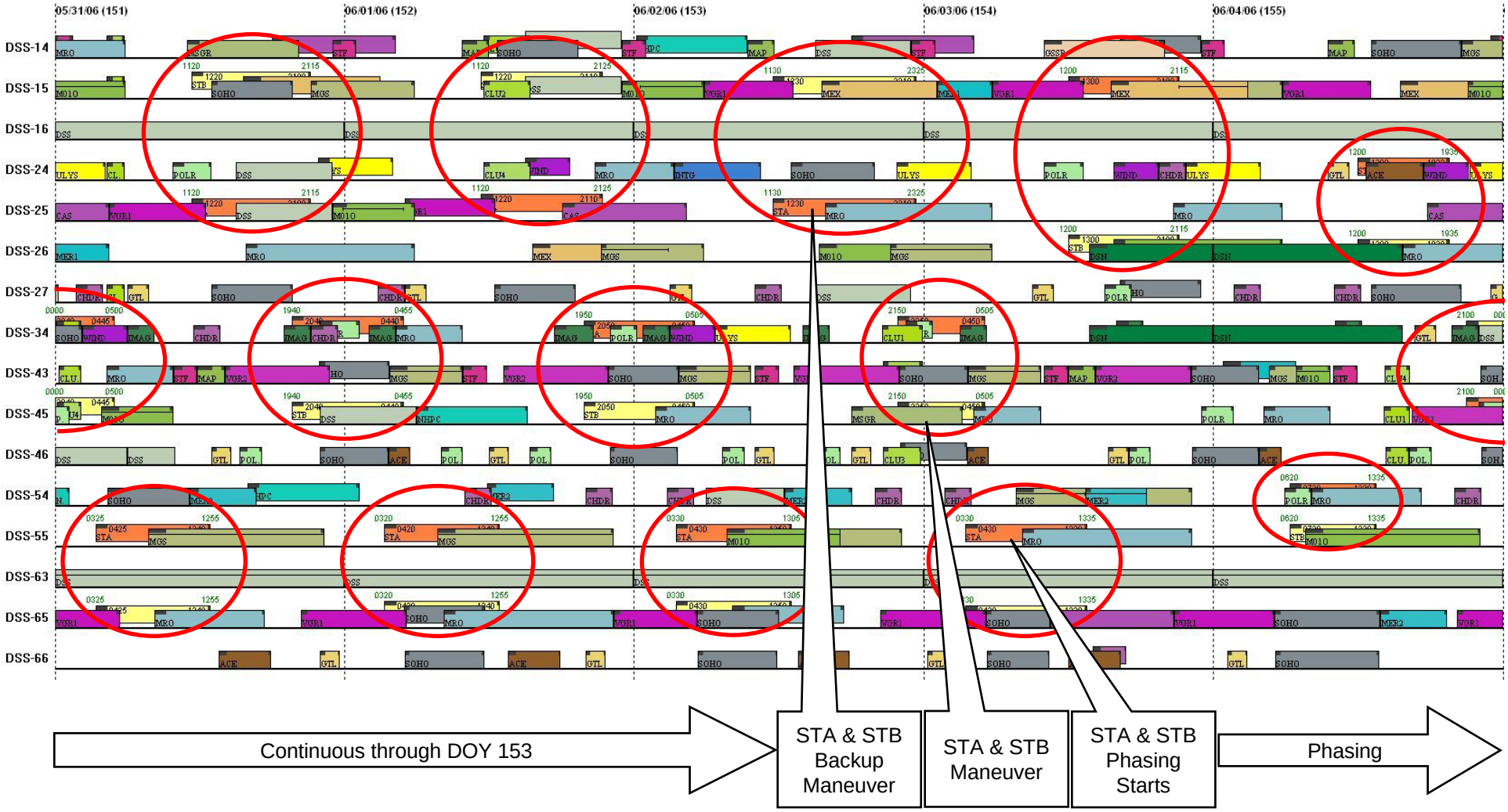


STA & STB Launch Day

Continuous through DOY 153

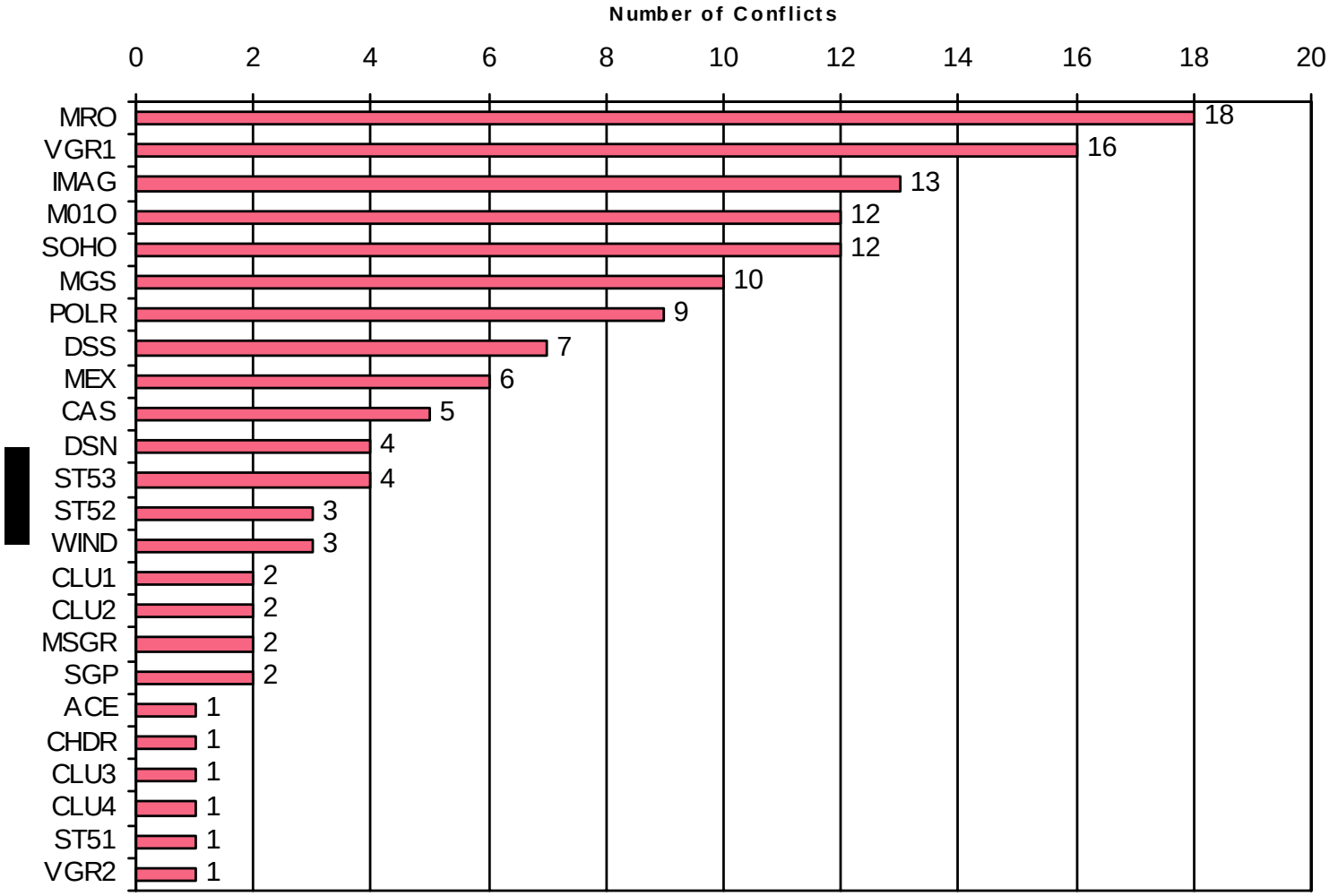
Resource Allocation Planning Service (RAPS)

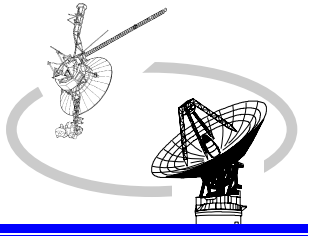
DOY 151 – 155



Resource Allocation Planning Service (RAPS)

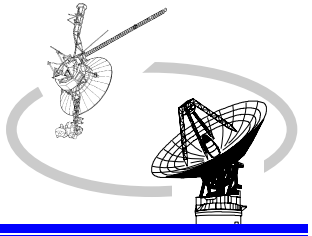
Total Number of Conflicts with STEREO by Project
DOY 146 – 155





Total Number of Conflicts with STEREO by Antenna and Project
DOY 146 – 155

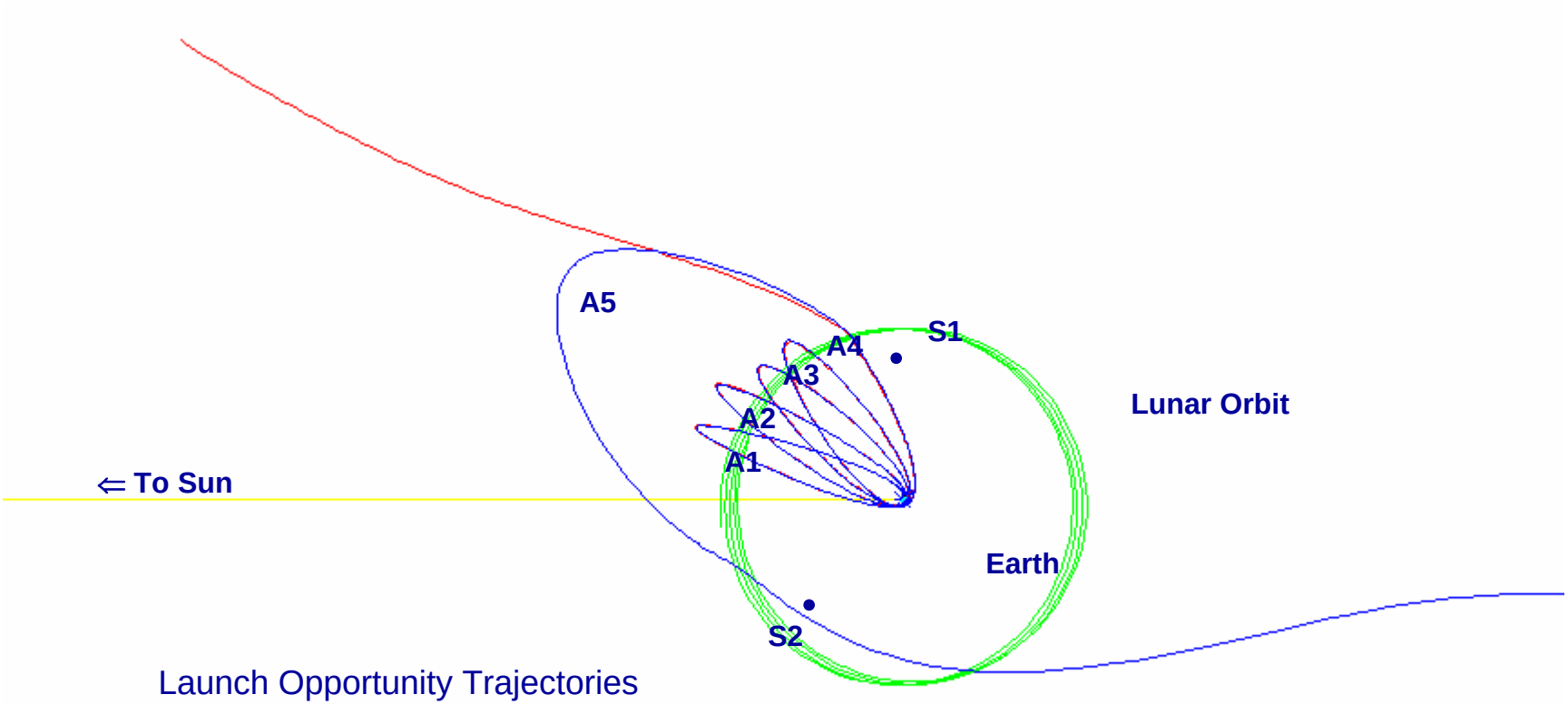
Mission	DSS-15	DSS-24	DSS-25	DSS-26	DSS-34	DSS-45	DSS-46	DSS-54	DSS-55	DSS-65	Grand Total
ACE		1									1
CAS			4							1	5
CHDR					1						1
CLU1					2						2
CLU2	1					1					2
CLU3							1				1
CLU4						1					1
DSN				2					2		4
DSS	1		1		2	1			1	1	7
IMAG					13						13
M01O	1		1	1	1	1			6	1	12
MEX	6										6
MGS	2				1	1			5	1	10
MRO			2	1	1	5		1	3	5	18
MSGR			1			1					2
POLR					5	2	1	1			9
SGP										2	2
SOHO	1				2	3	1			5	12
ST51					1						1
ST52					3						3
ST53					4						4
VGR1	6		2							8	16
VGR2						1					1
WIND		1			2						3
Grand Total	18	2	11	4	38	17	3	2	17	24	136



RAPS Conclusion

- **STEREO A & B Has Severe Contention Over The 10-day Period Of This Study**
  - **Every Pass Is In Conflict**
  - **136 Conflicts Over Ten Days Is High**
- **Adding STEREO After The December 9 Negotiation Meeting Will Cause Nearly Complete Rework Of The Schedule**
  - **Week 21 & 22 Will Be Posted For Initial Project Preview On November 21, 2005**
  - **Initial Negotiation Is Planned For December 9, 2005**

Resource Allocation Planning Service (RAPS)



Launch Opportunity Trajectories
red - Ahead
blue - Behind
purple – both

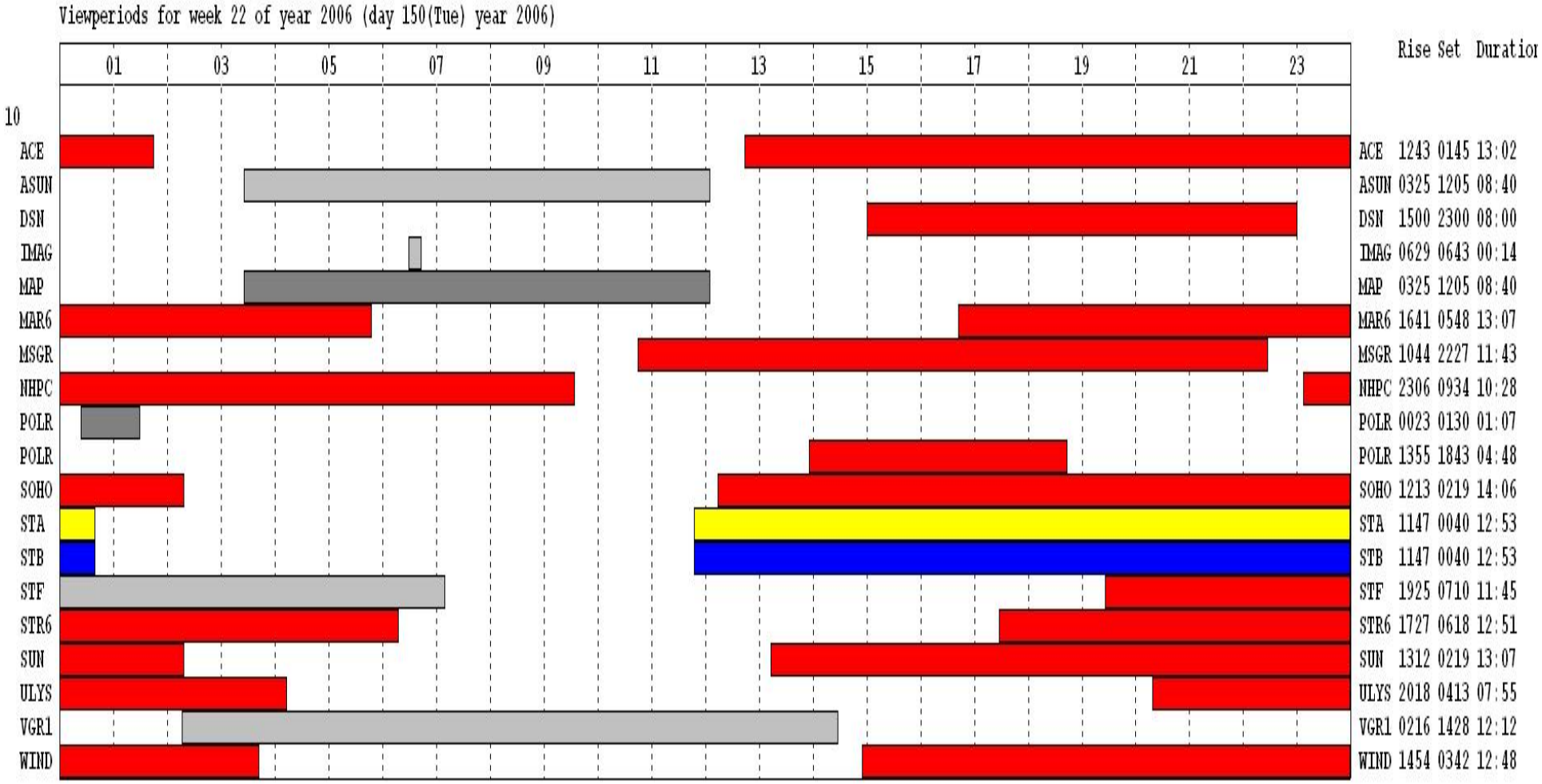
Solar Rotating Ecliptic-Plane View

Chart Attributed to David Myers (APL), Sept. 29, 2005

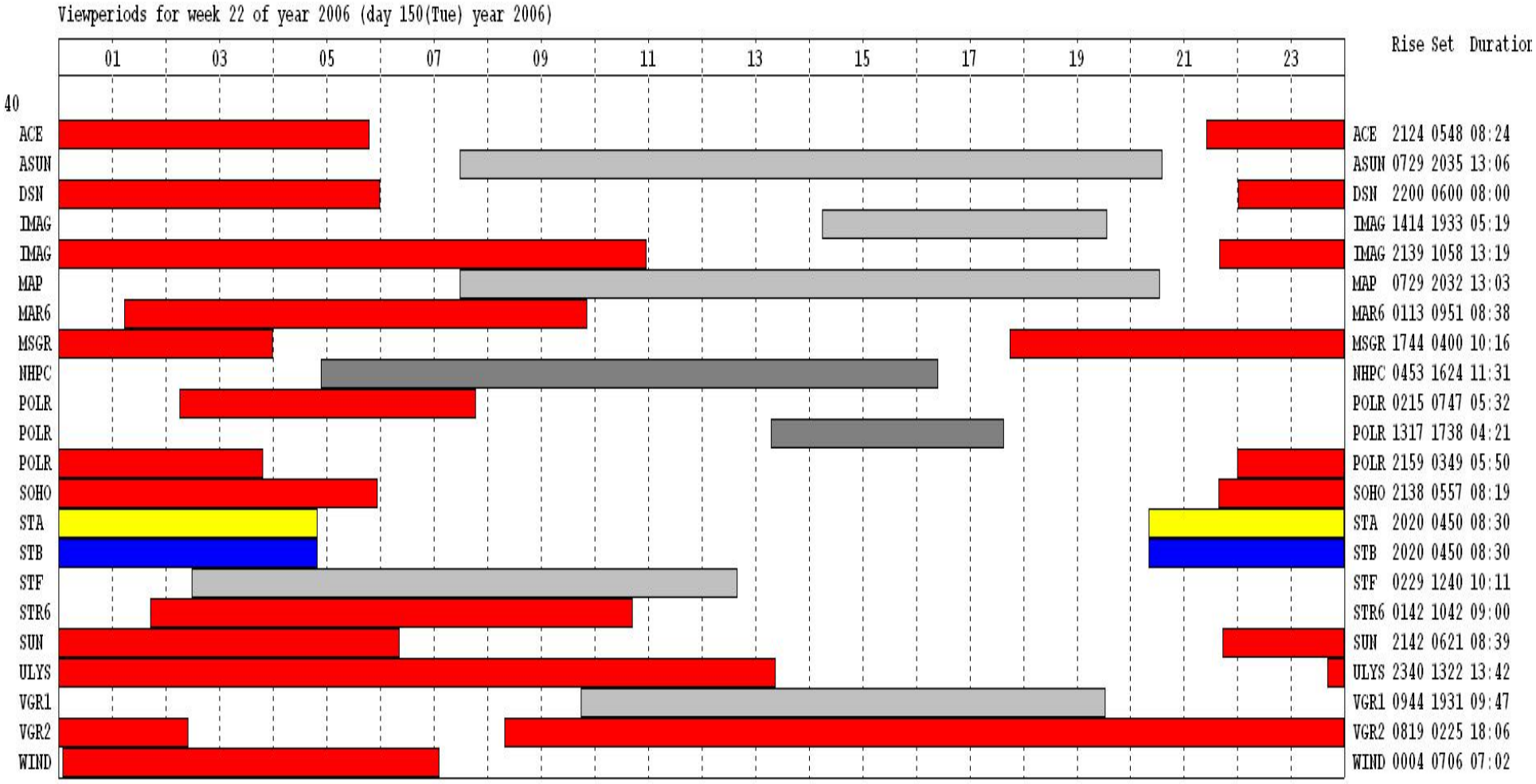
STEREO Ahead & Behind View Period Overlap

Note: STA is represented in yellow, STB is represented in Blue. The red bars indicate projects that have significant view period overlap with STA & STB. MAR6 represents the Mars view period, STR6 is the Cassini view period and DSN is the Maintenance view period.

View Period Overlap Chart at Goldstone DOY 150



View Period Overlap Chart at Canberra DOY 150



View Period Overlap Chart at Madrid DOY 150